TRMM Flight Operations Monthly Status Review (MSR)

August 29th, 2001

FOT Subsystem Overview

- Operations Status
  - Flight Ops Summary - Lou Kurzmiller
  - Electrical - Andy Calloway
  - Thermal - Dave Sepan
  - RCS & RF / Comm. - Dave Sepan
  - ACS & FDS / C&DH - Mark Fioravanti
  - Power & Deployables - Justin Knavel
  - LIS - Justin Knavel
  - CERES & VIRS - Mark Fioravanti
  - TMI - Dave Sepan
  - PR - Andy Calloway
  - Ground System - Andy Calloway
  - Upcoming Activities - Andy Calloway

Flight Operations Summary

- Supported 619 SN events in August

  - 2 Yaw Maneuvers; now -X

  - 7 Delta-V Maneuvers

- 2 Anomaly & 6 Event Rpts, 3 Generic Late Acqs

  - AR #92: TRMM in Sun Acq mode

  - AR#93: N2 Pressurant level reduction

  - ER #240: WSC; Equip failure

  - ER #241 & 242: Late Acq; TDRS out of view

  - ER #243: No acq; Did not lock onto 01/04 Kbps event

  - ER#244 & 245 Late Acq; TDRS events out of view

Flight Operations Summary

- Notable Events

  – Preparation/participation in Orbit Boost activities

  – Supported during & recovery; Sun Acq mode

  – Kalman Filter mode of operation

  – CMOC/JSC Lessons Learned activity

  – Attended meeting: NCC move to WSC

- FOT at full staff; no apparent problems

Thermal / Electrical Subsystems

- The Thermal subsystem remains nominal
  - No operational issues during the 402.5 km boost or operationally after arrival

- The Electrical subsystem remains nominal

  - No operational issues during the 402.5 km boost or operationally after arrival

RF Subsystem

- 3 Generic Late Acquisitions

  - 236/141100z 171 event: Locked up @ 141342z. One fwd reacq was sent. Dump/pb were performed. All data recovered.

  - 237/121400z TDE event: Locked up @ 121558z. One fwd reacq was sent. Dump/pb were performed. All data recovered.

  - 237/135100z TDE event: Locked up @ 135210z. One fwd reacq was sent. Dump/pb were performed. All data recovered.

- Frequency offsets (monthly average)

  - Transponder #1 = +736.543 Hz

  - Transponder #2 = -842.115 Hz

- 2 RF Event Reports and 1 MOCR this month

  - ER # 240: Dual Modulator Doppler Predicter fault was reported by CSC-3 for 217/1800z 171 event. All data was recovered.

  - ER # 243: Failure to acquire a TDE 1/4 K event at 226/0707z. CSC reported the event was scheduled as a 1/1 K event and not re-specified as a 1/4 K event. No data was lost.

RF Subsystem

- – FOT will create new configurations codes for coherent and non-coherent 1/4 K events for the NCC database.

- 2 Late Acquisitions and 2 Negative Acquisitions resulted from shifting view periods during the 402.5 km boost.

- Impact and lessons learned from Sun Acquisition:

  - – 22 Negative Acquisitions and 1 Late Acquisition occurred from blocked view of the HGA over a period of 5 days.

  - – Coherent low rate events will need to be scheduled sooner after transition to Sun Acquisition mode so that FDF can obtain more tracking data.

  - – FOT and FDF will be working on ways to improve HGA view predictions.

  - – FOT will avoid having both transmitters on at the same time.

- Upcoming Events

  - – Offset of transponder 2 frequency may still occur this year.

ACS Subsystem

- Transition to Sun Acq during Boost Activities on 01-225 (Mon., Aug 13th)

  - ESA Spikes during 3 & 4 Quadrant control resulted in accumulated yaw error and transition to Sun Acq. The Spikes were larger than 350km, because of lower signal to noise ratio at the higher altitude.

  - DSS-A marked bad, unable to perform Yaw update. Then ESA Quadrant 1 FDC reached 1st limit and placed ACE-B in control. ESA Quadrant 2 FDC 1st limit reached (no action taken since ACE-B was in control).

  - ESA Quadrant 1 FDC reached 2nd limit, and marked Quadrant 1 Bad. Then ESA Quadrant 2 FDC reached 2nd limit and marked Quadrant 2 Bad.

  - DSS-B marked bad, once both DSS's have been marked bad the ACS transitions to Sun Acq.

  - See Weekly Report (01 225-231) for more details.

- ACS placed in Contingency Mode on 01-228 (Thurs., Aug 18th)

  - Using Kalman filter for Attitude control.

  - No Re-Initializations of the Kalman filter were required following ΔVs or Yaw Maneuvers.

  - Gyro reset commands now being placed before each ΔV burn.

FDS/C&DH Subsystems

- Boost/Sun Acq. Table Activities

  - ACS Tables #54 & #81: loaded to RAM, on 01-211 (Mon., July 30th)

  - S/C RTS #117, uplinked on 01-213 (Wed., Aug 1st)

  - ACS Tables #73 & #85: loaded to RAM, on 01-218 (Mon., Aug 6th)

  - ACS Tables #80, #81, #90, & #102: loaded to RAM, on 01-228 (Thurs., Aug 18th), for Kalman filter

  - ACS Table #51: loaded to RAM, on 01-229 (Fri., Aug 19th)

  - ACS Tables #59, #76, & #84: loaded to RAM on 01-235 (Thurs., Aug 23rd), 402.5 km operational tables.

  - ACS Tables #73 & #85: restored from EEPROM to RAM (Thurs., Aug 23rd)

  - ACS Table #64: DSS table performance being review for possible update, since the S/C is in contingency mode.

FDS/C&DH Subsystems

- TO Status;

  – Since Contingency packets are constantly being dumped, there is a bandwidth problem on the low rate events.

  – Contingency mode packets are consuming all of remaining bandwidth which is preventing the event buffer from being dumped.

  – The rate at which the contingency mode packets are being dumped, will be changed to a lower rate to allow dumps to be performed.

- UTCF/FS Status;

  – Two Adjustments were performed. One on 01-218 (Mon., Aug 6th), and the other on 01-228 (Thurs., July 16th). The next on is expected on 01-268 (Tues., Sept 25th)

  – Current UTCF value is 31535996.818135 sec

  – A FS Adjustments was performed on 01-218 (Mon., Aug 6th), and the new value is x'7D2'. The next Adjustment is expected on 01-315 (Sun., Nov 11th), and will be adjusted to x'7DE'.

FDS/C&DH Subsystems

- DS Quota Table Reallocation

  - Reallocated all but 2 blocks of the recorder space from CERES to Housekeeping, on 01-228 (Thurs, Aug 18th)

    » Minimum of 2 blocks is required in each VR for Guardband

  - Housekeeping has over 7 hours of recorder time, instead of 4.

  - Since S/C was in Sun Acq, and all instruments were powered off, no science was lost during Quota reassignments.

- Planned RTS Changes

  - Nominal TDRS AOS RTS format changes to allow easier modification as DS storage status changes, and to simplify transponder offsets if required.

  - Initially will be performed with RTSs 65 - 68, other AOS RTSs may also be converted later.

Power Subsystem

- Sun Acquisition Performance

  – C/D ratio was above 1.10 for the first 12 hours. The average C/D ratio for the Sun Acquisition period was 1.06.

  – Since sunlight is directly on the Solar Arrays at sunrise, the current peak prior to 12 A per Battery Constant Current Mode was 43 A. The current peak is approximately 23 A with the Solar Arrays at the 50 degree stops at sunrise. There was no noticeable change in the Battery Differential Voltage and therefore, no change in Battery 2 Cell 1.

- Open issues

  – Essential Bus Voltage Monitor Backup (S/C Processor Current)

  – Solar Array off-pointing for longer durations

CERES/VIRS Instruments

- **CERES**.

  - Powered OFF.

- **VIRS**, continues to operate nominally.

  - Powered Off, from transition to Sun Acq. 01-225 (Mon., Aug 13th)

  - Powered On, on 01-229 (Fri., Aug 17th) at 21:28:51z, and placed into Outgassing mode.

  - Completed Outgassing Mode on 01-231 (Sat., Aug 19th) at 17:47:53z, and placed into normal science collection mode.

  - Two sets of VIRS Solar Calibrations were performed on 01-238 (Sat., Aug 26th).

TMI / PR Instruments

- No Open Issues with the TMI instrument

  – TMI was powered off due to transition to Sun Acquisition mode. It was powered on again on August 17 (01-229) @ 20:22:43z after recovery from Sun Acquisition.

- No Open Issues with the PR instrument

  – New interference was reported with Madras, India and Huangmei, China

  – PR Range Bin offsets for bins 1-4, 46-49 were installed following the first Delta-V boost maneuver at a mean altitude of approximately 360 km

  – PR was powered off due to transition to Sun Acquisition mode on August 13th (01-225). PR was powered on again on August 17th (01-229) and was back in Observation mode @ 20:46:18; the Range Bin offsets were also re-installed @ 21:07:46.

Ground System

- Emergency patch for MOPSS system scheduled for August 29; rollover problem would render MOPSS inoperable starting Sept 9th without the fix

- MP load Integrated Print problem due to memory leak still occurs intermittently - workaround is to perform soft reboot of the workstation and more frequent version file cleanup procedures

  – One possible long-term solution would be to switch form ISAM to Oracle

- /Hist1 4 GB External disk has failed again and will be replaced this week

Upcoming Activities

- 0-2 Months

  - Perform any necessary FSW revisions due to new Kalman Filter mode of operations (ex: mag field epoch patches, DSS Parameters updates, etc.)

  - Perform any new sensor calibrations due to FDF analysis

  - Transfer most recent FSW changes to EEPROM once fully validated

  - Establish new trend baseline for full seasonal changes at the new operational altitude

  - Test and install new Transponder-2 AOS Offset Relative Time Sequences

  - Perform SA 55° offset long-duration test

  - Test and install new TDRS HGA AOS RTSs

  - Generate new ODB to include newly-defined derived mnemonics

Upcoming Activities

- 2-3 Months

  - Complete testing and training with PSIB alternate telemetry patch

  - End Of Life Planning, Testing, and Simulations continue

  - Continue to close open CCRs, MOCRs, and MSR Action Items

  - Leonids 2001 will occur in November